

Revisiting Israel's Healthcare Priorities

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Introduction

Israel has good health outcomes, as measured by basic indicators such as infant mortality and life expectancy. At 82.1 years life expectancy at birth, Israel had the ninth highest rank in the world in 2015, down from the fifth place in 2013. Life expectancy in Israel grew at an average rate of 2.6 months per year between 1990 and 2015.¹

Historically, in line with the efforts of modern medicine, healthcare policy in Israel has indeed emphasized preventing death. However, as overall life expectancy has increased, particularly in developing economies including Israel, the years lived in good health has not increased as quickly. That is, increased life expectancy is not necessarily accompanied to the same extent by high-level functioning and wellbeing. Consequently, “good health” has become a much broader concept than simply life or death. The challenge of the modern healthcare system is to continue improving life expectancy by reducing age specific death rates across the population, while simultaneously optimizing the number of years lived in good health.

The goal of this paper is to assist Israeli policy makers in aligning the country's healthcare priorities towards maximizing good health by reducing the burden of disease, emphasizing high-level daily functioning and wellbeing throughout a long lifespan — i.e., increasing the number of years lived in good health with minimal burden of disease.²

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1 For more about Israel's high life expectancy, see Weinreb (2016) “Why Is Life Expectancy So High in Israel?” in the Taub Center's *State of the Nation Report 2016*.

2 The World Health Organization defines health-adjusted life expectancy (HALE) as the “average number of years that a person can expect to live in ‘full health’ by taking into account years lived in less than full health due to disease and/or injury.”

An accepted metric for capturing the concept of years lived in good health is the Disability-Adjusted Life Years (DALYs) measure, which accounts for both death and disability/poor health in one indicator and is amenable to comparisons across communities and over time. With the aid of DALYs, based on data provided by the Institute for Health Metrics and Evaluation, we first examine the trend in burden of disease in Israel for the period 1990 to 2015, to identify key developments over the last quarter of the century.³ Second, we compare the age-adjusted burden of disease in Israel to that of other developed countries, to identify the country's comparative strengths and weaknesses even when considering its younger population. Third, we compare Israel to the other countries with regard to gross (not age-adjusted) burden of disease, to help identify and anticipate the potential impact of Israel's quickly aging population – given that Israel's age distribution in about two decades will resemble that of the OECD today. In this context, we highlight the importance of more comprehensive prevention efforts, primarily around health behaviors, to help reduce chronic disease rates and ensure a healthier aging process.

1. The political economy of health priorities in Israel

As of 1995, Israelis enjoy universal entitlement to healthcare. Public financing is allocated to four competing health funds who oversee the provision of care. This allocation is done via a capitated risk-adjusted formula, based on age and gender, with an adjustment for those in the periphery. Entitlement to new technologies is determined by the government budget and the priorities of the Health Basket Committee. The committee prioritizes new medications and technologies to be included as part of the entitlement package, working with the portion of the state's budget allocated for this purpose.

3 The Institute for Health Metrics and Evaluation (IHME) at the University of Washington is responsible for an ongoing global study of disease burden, and consists of a collaboration of more than 500 researchers at 300 institutions in 50 countries. Mortality data comes from Israel's vital registry database. Morbidity estimates – including disease and injury incidence, prevalence, duration, and remission – are based on data from various sources, including household surveys, disease registries and monitoring data, and hospitalization and out-patient records. The weight or degree of disability assigned to a particular condition is based on surveys of the general public examining the public's perception of such different impairments. Where possible, the IHME incorporates Israel-specific data and in other cases, it applies European-region data.

Chernichovsky and Bowers (2014) found that while heart disease, stroke and cancer together account for 42 percent of deaths in Israel, these conditions accounted for only 18 percent of the disease burden in the country. In contrast, while orthopedic problems and depression do not cause virtually any deaths in Israel, they were responsible for 19 percent of the poor health in the country as measured by burden of disease.

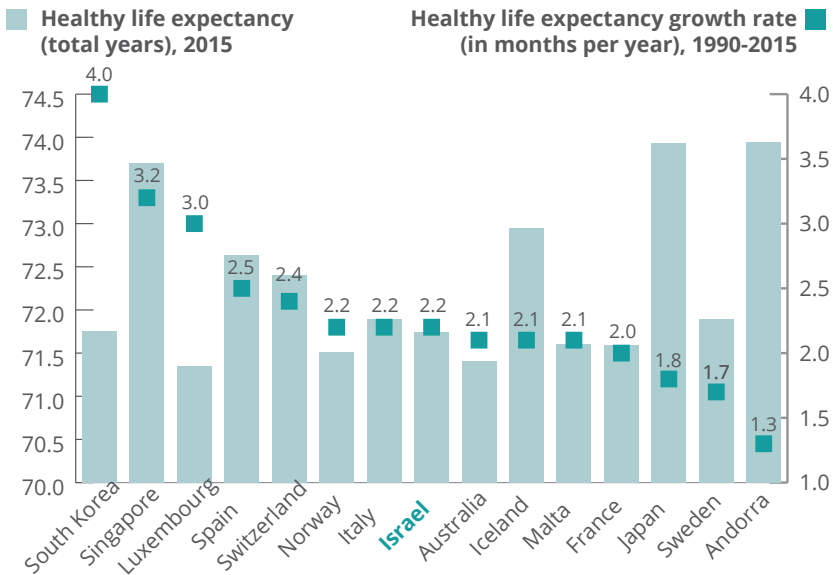
The authors showed that the allocation to healthcare in Israel through the capitation formula is fairly aligned with disease burden as measured by DALYs. On the other hand, the study revealed that the Health Basket Committee's recommendation is much more focused on prevention of mortality. The committee allocates a disproportional share of its funds towards cancer, heart disease and stroke — about half of the budget for new technologies — as compared to conditions which contribute to burden of disease such as orthopedics. The committee's approach, which follows in part from its limited mandate, tends to bias Israeli allocation towards prevention and delay of death rather than to reduction of disease burden.

2. Healthy years of life are growing at a slower pace than overall life expectancy

Not surprisingly, the top performing countries in overall life expectancy also tend to have higher health-adjusted life expectancies (HALE). As shown in Figure 1, a baby born in 2015 in Israel can expect to live, on average, 71.7 years in good health (or 87.4 percent of their life). Israel is ranked tenth in the world on this indicator. This is about 10.4 years less than the total life expectancy. Healthy life expectancy in Israel grew at an average rate of 2.2 months per year between 1990 and 2015.

Figure 1. Healthy life expectancy index and annual increase in the index

The 15 leading countries on the healthy life expectancy index



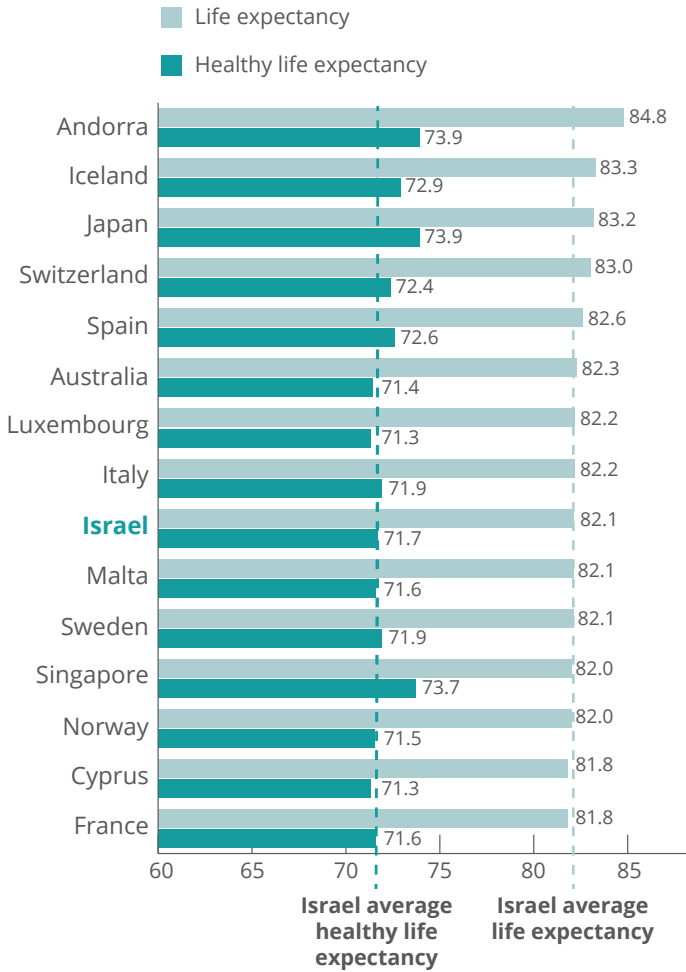
Source: Liora Bowers and Dov Chernichovsky, Taub Center.

Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

While many developed countries are seeing their total life expectancy grow faster than their health-adjusted life expectancy, that gap seems to be greater in Israel. Healthy life expectancy is growing at a rate of almost half a month per year (0.5) slower than the growth in overall life expectancy in Israel. Among the other 15 countries, the median difference between the two growth rates is just about 0.33 of a month. Israel's relatively inferior position may reflect that the country is yet to come to terms with its aging population (Azarieva et al., 2016). Specifically, the number of individuals aged 70 or older in Israel's population is expected to increase from about 610,000 today to 1.24 million in 2035 (Azarieva et al., 2016).

Figure 2 shows healthy life expectancy out of total life expectancy for the top fifteen countries in terms of total life expectancy.

Figure 2. Life expectancy and healthy life expectancy
The 15 leading countries on the healthy life expectancy index



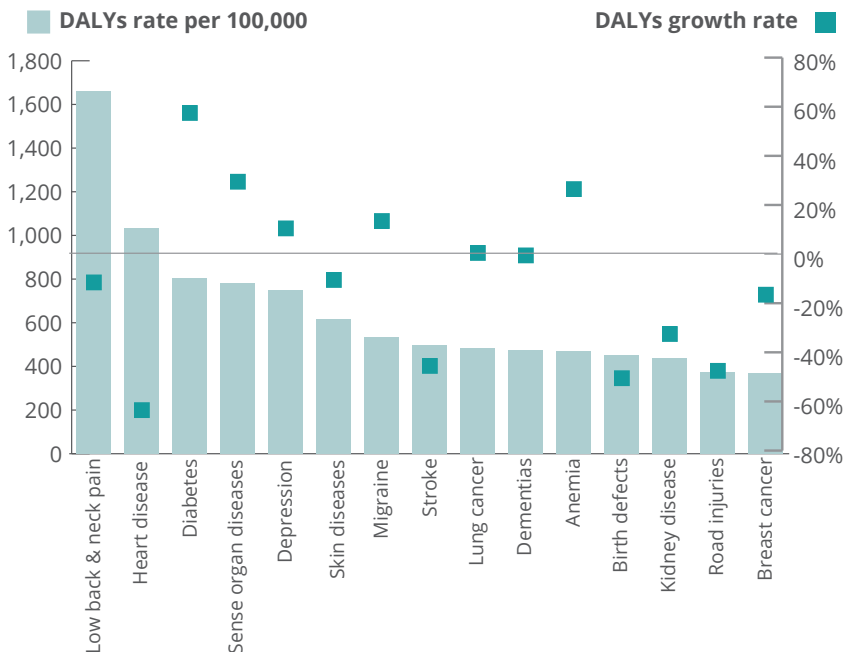
Source: Liora Bowers and Dov Chernichovsky, Taub Center.
 Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

3. Substantial decrease in overall disease burden over the last 25 years in Israel, but a notable increase in the impact of several conditions

Figure 3 shows the leading 15 conditions in terms of their gross disease burden on Israeli society in 2015 and the growth rate in DALYs between 1990 and 2015. In 2015, low back and neck pain, heart diseases, diabetes, sense organ diseases and depression accounted for the top five causes of DALYs in the country. Over this 25 year period, there has been a 17 percent reduction in the total burden of disease per 100,000 people. Much of the decrease globally stems from a reduction in death rates, and is manifested in the growing life expectancy.

Figure 3. Rate of total DALYs per 100,000 people and DALYs growth rate in Israel

The 15 leading causes of disability



Source: Liora Bowers and Dov Chernichovsky, Taub Center.

Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

There have been some change in the types of diseases and conditions that take their toll on the Israeli population, relatively speaking. This is due both to changes in the prevalence or management of the conditions themselves and in demographics, as Israel's elderly population is growing.

Of the 15 conditions responsible for the most disease burden in Israel in 1990, 12 remained on this list 25 years later, in 2015. Chronic obstructive pulmonary disease, falls and preterm birth complications were in the top 15 in 1990, but moved down as the relative rates of migraine, anemia and breast cancer rose and took their place in the top 15 in the 2015 estimates. Anemia can lead to dizziness and exhaustion, though even when asymptomatic and is linked to prematurity and low birthweight babies among pregnant women, as well as slower cognitive, language and motor development among babies and toddlers.

Nine conditions saw a reduction in the level of disease burden that they caused in the period between 1990 and 2015, and six conditions increased during this time. There has been an overall reduction in the total burden caused by twelve conditions, and an increase in the burden caused by six conditions. Conditions that have seen notable increases in the rate of DALYs over the last two and a half decades are diabetes, sense organ diseases, migraine, and anemia, with the burden from diabetes growing by almost 60 percent during this period.

There has been a major — 58 percent — reduction in the combined burden of heart disease and stroke. This substantial reduction has been a global phenomenon over the last several decades. Ford et al. (2007) carried out a comprehensive study of the reduction in heart disease rates in the US between 1980 and 2000. They attributed almost half of the decrease to improved medical treatments (such as better detection, initial treatment, rehabilitation and secondary prevention of heart attacks) and much of the rest to a decline in risk factors (reduction in cholesterol levels, blood pressure, and smoking, in that order of impact). In contrast, they found that increases in body mass index and in rates of diabetes over this time period have had the opposite effect — somewhat mitigating the reduction in heart disease that would have otherwise been seen.

New technologies for identifying and preventing birth defects and better care options for addressing preterm birth complications have also contributed to the substantial decrease in the disease burden caused by these conditions (50 percent and 77 percent, respectively). Both of these conditions, along with road injuries, chronic obstructive pulmonary disease (COPD) and falls have seen their relative rank in terms of burden fall substantially during this period.

4. Israel's health challenges today

To understand Israel's comparative health status and challenges today, its advances over the last quarter of a century notwithstanding, it is important to consider DALYs on an age-adjusted basis, which controls for the substantial differences in the underlying age structures of the population. This approach allows us to identify those diseases and conditions that – regardless of the age distribution – Israelis suffer from more or less relative to the populations in the EU-15 (Figure 4).⁴

Of the top 15 age-adjusted conditions that are the leading cause of DALYs in Israel, 12 of them are in Europe's top 15.⁵ The top three leading causes of DALYs are the same – low back and neck pain, heart disease, and depressive disorders. There are three conditions that make Israel's list – birth defects, kidney disease and breast cancer – that are not on Europe's, and vice versa when it comes to self-harm, falls and anxiety disorders.

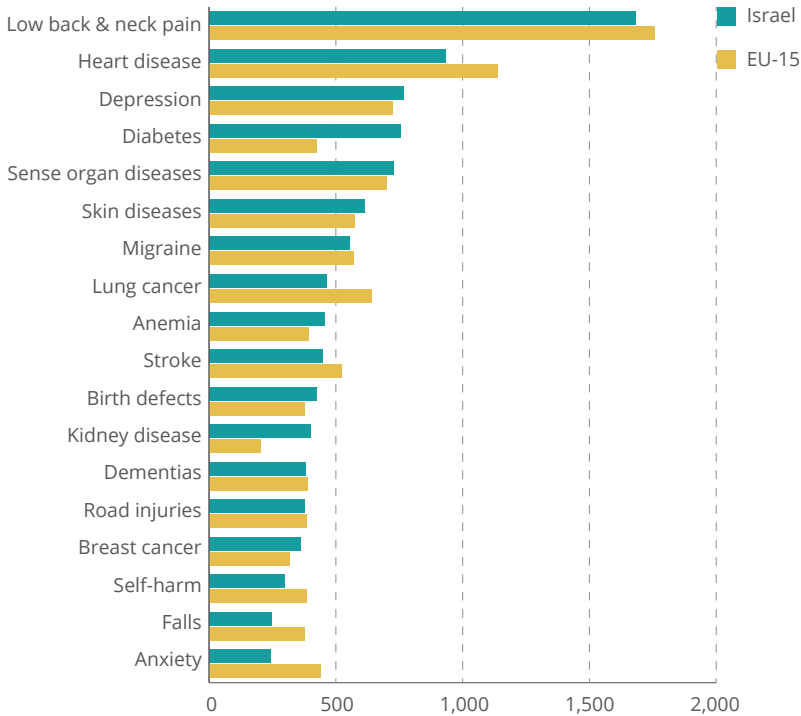
Israel's population is just slightly healthier than that of the EU-15's. The country has a lower rate of DALYs than the EU-15 in 10 of the 18 conditions (18 includes both geographies' top 15 conditions). Israel maintains a sizeable advantage with regards to lower rates of heart disease and lung cancer, even on an age-adjusted basis.

This analysis, however, points particular attention to Israel's dire situation with regard to diabetes, where Israel has nearly a 90 percent higher rate of DALYs than the EU-15 on an age-adjusted basis. Diabetes has a strong correlation with socioeconomic status, with lower-income populations suffering from substantially higher prevalence. Diabetes is the leading cause of kidney disease, which itself has nearly double the health burden in Israel than in the other European countries. End-stage kidney disease is a difficult condition, which requires either treatment with dialysis or a transplant, or it results in death. Anemia, birth defects and depression similarly have a higher age-adjusted burden in Israel than they do in the EU-15. Finally, breast cancer, potentially related to the prevalence of the BRCA-gene linked to breast cancer in the Ashkenazi Jewish population, has a slightly higher disease burden in Israel than in the EU-15.

4 The EU-15 refers to the 15 countries that comprised the EU prior to the addition of ten countries in 2004. The countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. This set of countries was selected for comparison to Israel, as their data were aggregated by the Institute for Health Metrics and Evaluation and it represent the best available comparison of developed nations for this dataset.

5 Both age-adjusted and gross DALYs figures are provided by the Institute for Health Metrics and Evaluation, using standard age-adjustment techniques commonly used in epidemiology.

Figure 4. Age-standardized DALYs rate by cause,* 2015
Per 100,000 population



* Top 15 causes in Israel and in the EU; in order of top 15 causes in Israel. Note that 18 conditions are shown because there are 3 conditions that are in Israel's top 15 conditions but not in the EU-15's, and vice versa.

Source: Liora Bowers and Dov Chernichovsky, Taub Center.

Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

In addition to understanding the conditions responsible for poor health, it is important to understand the underlying key risk factors that lead to these conditions. The Institute for Health Metrics and Evaluation has developed 21 risk categories that include environmental, behavioral and metabolic risk factors.⁶ In Israel, these factors are responsible for an estimated 56 percent of disease burden while the remaining burden could not be explicitly

⁶ These 21 categories include a total of 79 risk factors. Metabolic risk factors include high blood pressure, cholesterol, blood sugar levels, and/or body-mass index (BMI).

attributed to specific risk factors (e.g., genetic risk factors are not included among the 21 categories). It is important to note that behavioral and environmental risk factors can have some interconnection and overlap with metabolic factors. For example, high blood pressure is influenced both by diet and physical activity, which are behavioral factors, as well as genetics, health system interventions such as blood pressure reducing medications, and other factors.

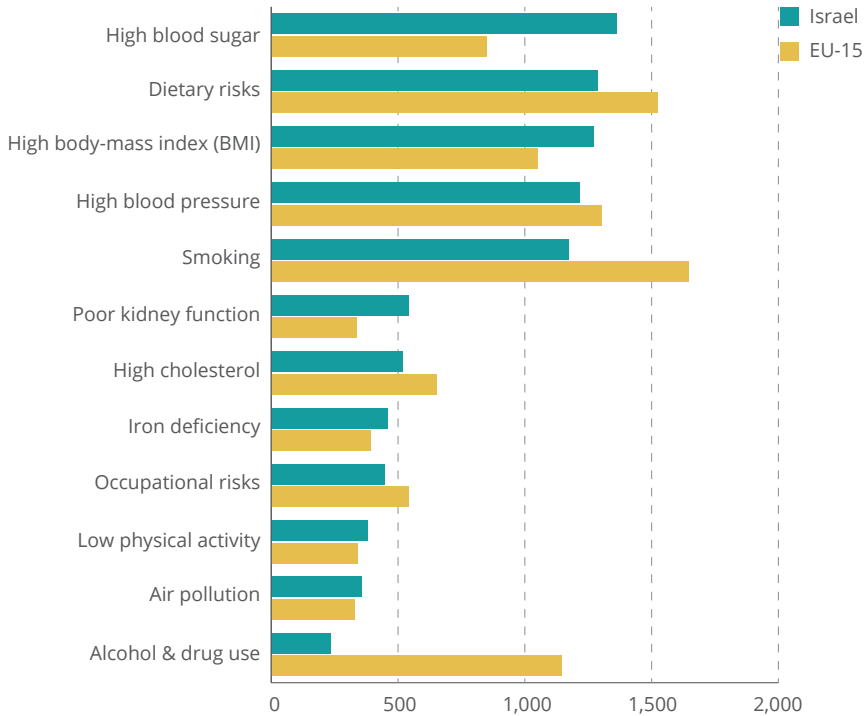
Between 1990 and 2015, high-fasting blood sugar levels moved from the sixth to the first largest risk factor for disease burden in Israel, and accounted for 7.9 percent of the country's DALYs in 2015). This risk is particularly linked to diabetes as well as, to a lesser extent, cardiovascular disease. Dietary risk is the second largest risk factor, responsible for about 7.4 percent of disease burden, and contributes to heart disease, stroke, diabetes, and cancer. These same conditions, along with musculoskeletal disorders are also related to high BMI, the fourth largest risk factor identified.

High blood pressure and high total cholesterol both moved down over the 25 years between 1990 and 2015. The decline in importance of these risk factors may have to do with the widespread and successful proliferation of medications used to treat these conditions, particularly a group of medications known as statins used for improving cholesterol levels in the body.

Figure 5 shows that metabolic factors are of greater risk in Israel than in the EU-15 — impaired kidney function and high blood sugar levels rank much higher in terms of risks in Israel than in the EU-15 with the latter causing 61 percent more DALYs in Israel than in Europe on an age-adjusted basis. High body mass index is also notably more problematic in Israel, responsible for an estimated 21 percent more DALYs in Israel than in Europe. These findings align with the higher burden of diabetes and kidney disease in Israel than in the EU-15 countries.

In contrast, behavioral factors, namely smoking and alcohol and drug use, rank as much higher risks in the EU-15 than in Israel and are clearly related to the higher burden of lung cancer in Europe. Dietary risks and high cholesterol contribute to a substantially greater absolute rate of disease burden in the EU-15. This finding aligns with the common perception that the Mediterranean diet in Israel — high in vegetables, legumes and dairy — provides for relatively good nutritional intake and better health.

Figure 5. Top risk factors by rate of DALYs attributable, 2015
Age-standardized, per 100,000 population



* Includes top 12 of the 21 risk factor categories for Israel and EU. (The remaining 9 risk factors all rank the same in both Israel and the EU-15 in terms of the rate of attributable DALYs.)

Source: Dov Chernichovsky and Liora Bowers, Taub Center.

Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

5. Israel's upcoming health challenges

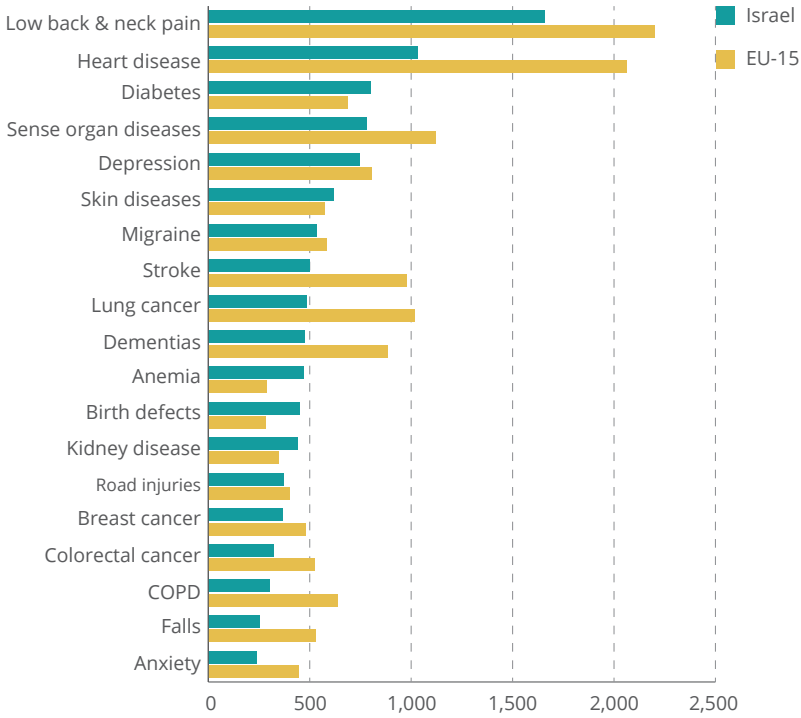
We now conduct a comparative analysis of the gross disease rates between Israel and the EU-15 (that is, not age-adjusted). Assessing Europe's gross rates today allow us to see which health problems are more pronounced in an older population; providing a clearer picture of those issues that may become more prevalent in Israel in a few decades as the population ages.

Across the top 15 conditions in terms of gross DALYs in both countries, Israel has about a third less disease burden total than the EU-15 (total of 10,856 DALYs per 100,000 people compared to 14,855 for the EU-15). This reflects Israel's comparatively young population.

There are 11 conditions that are found in both geographies' top 15 list. Namely, in spite of Israel's different age structure, Israel still resembles the other countries. There are, however, four conditions that make Israel's top 15 list — birth defects, kidney disease, anemia, and road injuries — that are not in Europe's 15, and vice versa — chronic obstructive pulmonary disease, colo rectal cancer, falls, and anxiety disorders.

As such, Figure 6 below shows the 19 total conditions that encompass both Israel and the EU-15's top causes of DALYs. The top 15 causes of DALYs in Israel account for just over half of the entire disease burden in the country (52 percent), similar to the share in Europe. Of the 19 conditions shown, Europe suffers more from 13 of them. Israel has noticeably lower rates of DALYs from low back and neck pain, heart disease and stroke, lung cancer, and dementias. On a gross level, Israel suffers somewhat more from diabetes, anemia and birth defects.

Figure 6. DALYs rate by cause,* 2015
Per 100,000 population



* Top 15 causes in Israel and in the EU; in order of top 15 causes in Israel. Note that 19 conditions are shown because there are four conditions that are in Israel's top 15 conditions but not in the EU-15's, and vice versa.

Source: Liora Bowers and Dov Chernichovsky, Taub Center.

Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

Figure 7 disaggregates the differences in the gross disease burden in the two geographies by the factor that is due to differences in the age structure of the population (age-related rate), and that which is due to the prevalence or treatment of the condition itself (known as the age-specific rate). For example, Israel has a much lower burden of heart disease both due to having a younger population (age-related) and having a lower prevalence of the condition among Israelis and Europeans in the same age-group, e.g., those ages 50-59 (age-specific).

The impact of age structure on the population's health status is evident. A younger population reduces the total burden of disease present in Israel, as only 3 of the 18 conditions shown tend to take a higher toll on younger populations (skin disease, anemia and birth defects) compared to older ones. In contrast, merely having an older population distribution such as that in the EU-15 increases the disease burden associated with 15 of the 18 conditions. Issues that are noticeably more pronounced in an older population include heart disease and stroke, cancers, dementia, and mental illnesses. As Israel's population ages, it is vital that the healthcare system aligns itself with the additional health burdens and changing health needs of its aging population. Looking at the rate of DALYs caused by each condition, we see that low back and neck pain, heart disease, cerebrovascular disease, lung cancer, dementias, self-harm, falls, and anxiety are more pronounced in Europe compared to Israel both due to the older population age structure and the higher prevalence and/or relatively poor management of the condition itself. Conditions that are more pronounced due to both a younger population age structure and the higher prevalence and/or relatively poor management in Israel include birth defects, skin diseases and anemia. Other conditions are split, such as in depression, where Israel's age structure pulls the rate of disease burden downwards but its age-specific rate pushes it upward.

Figure 7. Difference in rate of gross disease burden (per 100,000 people) between the EU-15 and Israel
 Disaggregated into age-related (population structure) and age-specific (prevalence/management/treatment) components



Source: Liora Bowers and Dov Chernichovsky, Taub Center.
 Data: Institute for Health Metrics and Evaluation, Global Burden of Disease collaboration.

6. Conclusion

Several results emerge when assessing Israel in an international perspective in terms of healthy years lived and DALYs: Israel has the ninth highest life expectancy in the world in 2015 — but has fallen from fifth place in 2013. Life expectancy grew at an average rate of 2.6 months per year between

1990 and 2015. The country ranks tenth out of the top fifteen countries in the world in terms of length of life expected to live in good health with an average growth of 2.2 months per year. Furthermore, Israel's gap between the growth in total life expectancy and healthy life expectancy – about half a month a year – is somewhat larger than that of other countries with high life expectancy.

Alongside growing life expectancy comes a decrease in the overall burden of disease over the last 25 years, although many of the top 15 causes of diseases have mostly remained the same. The ranking of diseases has changed, however. Major improvements were seen particularly in the burden of heart disease and stroke both in Israel and globally, as well as decreased disease burden due to preterm birth complications and birth defects. At the same time, however, sense organ diseases, migraine and anemia have led to growing rates of disease burden, and the rate of DALYs caused by diabetes has increased by almost 60 percent between 1990 and 2015. Aligned with this finding, high blood sugar levels jumped from sixth to first place in terms of risk factor for disease burden in Israel during this period. Other metabolic risks such as impaired kidney function and high body mass index also rank higher in Israel than in Europe.

The two geographies have a great deal of overlap in terms of their health issues on an age-adjusted basis, with low back and neck pain, heart disease and depression as leading health issues. Nonetheless, even after accounting for the different age structures of the two geographies, Israel has a sizeable advantage with regards to lower rates of heart disease and lung cancer, and has lower rates of self-harm, falls and anxiety. However, Israel has nearly a 90 percent higher rate of DALYs than the EU-15 due to diabetes, and the burden caused by kidney disease, anemia, birth defects, breast cancer, and depression is also somewhat higher than in the EU-15.

In terms of individual choices, however, Israelis still perform better in some regards than their developed country counterparts. Both alcohol abuse and smoking are more significant risk factors in other developed countries than in Israel. While smoking rates have been declining with time, 20 percent of tenth-grade Israelis have tried smoking a cigarette compared to 17 percent in Europe while a recent study indicated that over time in Israel, successive generations are beginning to smoke at earlier and earlier ages (Ministry of Health; Kalter-Leibovici et al., 2015). Israel's Mediterranean diet – based on high consumption of vegetables, legumes and dairy – is likely a reason that dietary issues still contribute less in terms of DALYs in Israel than they do to in the EU-15, even on an age-adjusted basis. However, food prices in Israel have risen particularly fast. Between 2000 and 2014, food

prices rose 53 percent in contrast to 32 percent for the overall Israel CPI (Brand, 2015). Purchasing a healthy food basket is increasingly unaffordable for many Israeli families, which may make the country's dietary advantage diminish over time (Azarjeva et al., 2016).

It is important to note that sugar consumption in Israel, however, is quite high. Children in Israel drink more sweetened beverages than those in the US (41 percent of fifteen-year-old girls in Israel versus 30 percent in the US reported drinking a sweetened beverage daily, 45 percent of Israeli boys compared to 37 percent of American boys (Hayut, 2016). In addition, the data on risk factors indicate that Israelis consume particularly low amounts of whole grains. The Ministry of Health is taking active steps to improve nutrition, with recommendations on much clearer consumer labeling under consideration, limitations on marketing of unhealthy foods to children, and enforcement of guidelines removing unhealthy foods from schools. However, the current system of food price supervision does not consider nutritional factors. Thus, for example, the price of white bread is regulated while that of whole wheat is not. Assuring a leadership role for the Ministry of Health and public health officials in such issues could help in improving overall nutrition and food access.

Having a younger population benefits Israel substantially with regards to health today, as 15 of the top 18 conditions cause a greater burden of disease in Europe simply because of its age structure. In Israel's case, a younger population age structure leads to a higher disease burden than Europe stemming from birth defects, skin disease and iron-deficiency anemia. With regard to anemia, effective government-regulated flour fortification programs could go a long way towards addressing this issue (Hurrell et al., 2010).

In contrast, low back and neck pain, heart disease, cerebrovascular disease, lung cancer, dementias, self-harm, falls, and anxiety are more pronounced in Europe, mainly but not only, due to Europe's older population age structure. Israel's population is aging quickly, and in a couple decades, is projected to be more like that of the European countries today. As such, it is vital that Israel arrange the structure, resources and functioning of its health system and anticipate the medical priorities that will be required in the coming years.

Even more importantly, the health policy makers need to focus broadly and extensively on prevention efforts that will reduce rates of chronic disease and ensure healthier aging. Namely, healthier diet and greater physical activity are high priorities, along with other lifestyle behaviors such as better sleep, lower levels of stress and better mental health, and

lower rates of smoking. Such efforts must be holistic, involving various public and private stakeholders relevant to health — including education, transportation, housing, and employers — and occur on both the national and municipal level. Such prevention efforts — particularly among those who are younger today — are key to changing Israel's current course and reducing the anticipated disease burden a generation from now. A particular window of opportunity lies in improving nutrition of women prior to, during and following pregnancy, which has the clear potential to impact not only the mother but the long-term health trajectory of her baby.

The DALYs perspective allows us to view Israel's health status via a different angle. Applying this tool to Israel indicates that the country has room for improvement in several areas. Israel should continue to focus its health system on promoting good health and daily functioning, in order to improve the share of one's life lived in good health. In addition, certain conditions such as diabetes, low back and neck pain, and depression need to receive more attention given their relative contribution to disease burden in Israel. Finally, the country's policy makers must consider ways to address risk factors such as high blood sugar levels and body mass — linked closely to diabetes — which seem to be growing quickly and are responsible for far more disease burden in Israel than in the EU-15.

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